DOCUMENT RESUME

ED 083 227 SP 007 425

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TITLE An Examination of the Research on the Effectiveness of Microteaching as a Teacher Training Methodology.
PUB DATE Mar 73
NOTE 56p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS *Effective Teaching; *Microteaching; Research Criteria; *Research Design; Research Methodology; Research Problems; *Teacher Education; *Training Techniques

ABSTRACT

This paper reviews 69 studies on microteaching, focusing on three main areas: a) the rationale behind its use, b) the conditions and degrees of possible goal attainment, and c) policy making in teacher education in relation to it. The first section of the paper presents an overview of microteaching, emphasizing the criteria used in analysis. The second section discusses the variables of modeling, practice conditions, and feedback in microteaching research. Two general types are reviewed: a) control group studies and b) studies with no comparison groups. The final section considers unresolved questions pertaining to the utility and worth of microteaching in teacher education. Six pages of references are included. (BRB)

ED 083227

AN EXAMINATION OF THE RESEARCH ON THE EFFECTIVENESS OF MICROTEACHING AS A TEACHER TRAINING METHODOLOGY

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March, 1973

SP 007 425

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AN EXAMINATION OF THE RESEARCH ON THE EFFECTIVENESS OF MICROTEACHING AS A TEACHER TRAINING METHODOLOGY

Introduction

Over the last decade teacher training institutions in this country have been severely criticized for their apparent inability to prepare adequately their graduates to be teachers. Critics within and outside of the teaching profession have attempted to identify reasons for the problem. Although they often disagree on their recommendations and their diagnosis, they all criticize the inadequacy of present teacher education programs (Koerner, 1963; Rickover, 1963; Conant, 1963; Smith et al., 1969; Silberman, 1970).

Increased allocation of resources in the 60's to improve teacher education are evidence of the concern for improvement, and a variety of innovations in teacher education programs have resulted. One of those innovations, microteaching, has achieved widespread publicity and a record of relatively spectacular implementation by teacher training institutions. Between the time of its inception at Stanford University in 1963 and 1970, microteaching as a teacher training device has been integrated into the teacher preparation programs of 141 NCATE institutions according to Ward (1970). One can infer from the large number of institutions using some variation of microteaching that many educators consider it to be a promising training device. Considerable research

data, of varying quality, bearing on the effectiveness of microteaching as a training tool has accumulated.

Despite the rather wide usage of microteaching and the existence of considerable research data about it, its usefulness and value are still debated by researchers and practioners (Peck and Tucker, 1973). This paper is an effort to shed some light on what is known about the process and effects of microteaching on teacher trainees. The paper also briefly examines issues that are relevant to the utility of microteaching as a training methodology and that remain unanswered by current research. Specifically, the paper examines three general questions: (a) What is the rationale underlying the use of microteaching? (b) On the basis of available evidence, under what conditions and to what degree may it be said that microteaching is capable of attaining its goals? (c) What are some implications of microteaching research for policy making in teacher education?

My paper is organized around each of the three questions above. The first section of the paper describes briefly microteaching and outlines the basic assumptions underlying its use in teacher training programs. The second section of the paper presents an overview of the microteaching research and describes the criteria which guided my analysis of microteaching research. A review and critical analysis, based on the criteria outlined in section two, of significant research relevant to the effectiveness

of microteaching comprises the third section. The final portion of the paper considers important and unresolved questions pertaining to the utility and worth of microteaching in teacher education.

Microteaching: Description and Rationale

"Microteaching" is the term coined by Dwight Allen and his associates at Stanford University in the early 1960's as they developed a teacher education program which provided teacher candidates with opportunities to systematically study and practice specific teaching behaviors in a simulated environment.[1] The term "microteaching" implies a condensed and simplified teaching situation. Although microteaching can be, and is, structured in a variety of ways, it usually consists of teaching that is scaled down in three ways. First, the duration of the lesson is considerably shorter than the normal time of fifty to sixty minutes. Second, the classes have only a small number of pupils. Third, the trainees doing the teaching are expected to concentrate on a limited number of specific teaching behaviors in each lesson.

The microteaching model commonly consists of four basic phases: (a) The trainee studies a specific teaching skill. (b) He attempts to apply the skill in a five to ten-minute lesson taught to three

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[1] In practice microteaching is used in pre-service and in-service programs.

to seven pupils. (c) He receives information feedback from a supervisor about the quality of his performance, written evaluations from the pupils to whom the lesson was taught, audio or video recording of the lesson, or a combination of the sources.[2] and (d) The trainee uses information from the feedback phase to replan and reteach the lesson, trying to improve the quality of his performance of the behavior, to a new group of pupils (Allen & Ryan, 1969; Meier, 1968; Allen, 1967; Borg et al., 1970).

Microteaching programs throughout this country deviate from the basic model as they attempt to adapt the model to fit specific needs and situational constraints of individual institutions. For example, some programs expose the trainees to an array of filmed exemplars of specific desired teaching behaviors prior to the teaching. Other institutions, perhaps less affluent, use only written descriptions of the behaviors as models. Some programs use video feedback, while other programs use audio or written accounts of lessons as feedback to trainees. Different programs may also vary according to the length of the teaching period, the number of pupils used in the microclasses, the nature of the pupils, the particular teaching behaviors practiced, etc. Ward (1970) provides a

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[2] Information "feedback", a concept borrowed from engineering and the physical sciences, in microteaching is the process by which data, gathered by a variety of sources during the teaching of a microlesson, is presented or "fed back" to the teacher. The purpose of giving the teacher feedback is to permit him to see discrepancies between his performance and his conscious intentions, thus allowing him to judge the amount and kind of change required for him to improve the quality of his performance.

detailed survey of the use of microteaching in secondary education programs.

Microteaching proponents such as Allen & Ryan, Mieir, Cooper & Allen, and Smith et al. argue that the approach offers authentic teaching practice in a setting that diminishes the complixities of normal classroom teaching and thereby allows the trainee to focus on the application of specific pedagogical skills. Microteaching, they also argue, allows trainers considerable control over the practice situation since factors such as time, number of pupils, kind of feedback, and the number of times a lesson is taught can be manipulated. "Scaling down" the teaching environment is intended to reduce the anxiety of the trainee in his initial contacts with pupils, and, at the same time, avoid jeopardizing the schooling of the "microclass" pupils since the content of the microteaching lessons are usually not a replacement of the pupils' normal curriculum.

There are three assumptions microteaching programs appear to make about the skills of teaching (Allen & Ryan, 1969; Borg et al., 1970). First, teaching may be operationally defined into specific teaching acts, sometimes referred to as the "technical skills" approach. Second is the assumption that mastery of these skills increases the probability of becoming a successful teacher. Third, it is assumed that increasing a teacher's skills repertoire will enhance his freedom by making him more versatile. Ward (1970) found that most microteaching programs were aimed at helping prospective teachers acquire a limited repertoire of technical teaching skills.

Those responsible for microteaching programs appear to have usually selected the target skills by making intuitive judgments about which particular skills would be most needed by teachers and would be amenable to microteaching training (Allen & Ryan, 1969; Borg et al., 1970). The skills specified for the microteaching program at Stanford included: (1) Stimulus variation, (2) set induction (a pre-instructional orientation to a lesson), (3) closure (summarizing and culminating an instructional activity), (4) silence and nonverbal cues, (5) reinforcement of student participation, (6) probing questions, (7) higher order questioning, (8) asking divergent questions, (9) recognizing attending behavior, (10) using examples and illustrations, (11) lecturing, (12) using planned repetition, and (13) asking questions fluently (Allen & Ryan, 1969). Ward (1970) found that the most commonly selected skills in microteaching programs in NCATE institutions were (in the order of frequency used): (1) asking questions, (2) establishing set, (3) reinforcement, (4) use of examples, and (5) varying stimulus.

A second set of assumptions relates to the process through which microteaching supposedly facilitates the acquisition and refinement of specific teaching skills. The microteaching process may be viewed simplistically as a three-step process. First, the trainee learns about the teaching skills he is to perform. That is, he is presented with one or more models of acceptable teaching behavior regarding a specific skill. Second, he tries to emulate the model in a scaled-down classroom setting.

Third, the trainee receives feedback about how his teaching corresponded with the model.

Microteaching as a training methodology is probably based on reinforcement learning theories, which suggest that a person's behavior can be changed by giving him some kind of reward or positive reinforcement when he behaves in the desired manner (Meier, 1968). Microteaching is structured in ways which provide conditions for reinforcement of desired teacher behavior in order to bring about a change of a teacher's classroom behavior in the direction of a criterion performance. When a supervisor is used, his primary function in the feedback phase is to praise or reinforce the trainee in some way when his performance approximated that of the model.[3] The assumption is that the praising or rewarding of the trainee for teaching behavior that approximated that of the model will increase his use of the behavior in the future. The feedback from "micro-class" pupils and/or from an audio or video recording of the lesson can serve the same purpose, except that the feedback may not emphasize the reinforcing of positive behavior as much as would the feedback from a supervisor.

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[3] That requires considerable skill on the part of a supervisor. One can safely assume many supervisors fall short and probably render other kinds of feedback as well. One must keep in mind that the description of microteaching phases here implies an ideal or pure type of microteaching. In microteaching, as in the implementation of any complex program, there is considerable deviation from any ideal type or model.

Overview of Microteaching Research

Kinds of Studies

Sixty-nine studies were examined in this review, though not all are cited. Many other studies are not reported here because they were based on highly subjective and testimonial data. Over three-fourths of the sixty-nine studies were conducted in on-going microteaching programs. The remaining studies, though not conducted in microteaching settings, were clearly relevant to microteaching. Stanford University researchers or alumni accounted for a greater percentage of studies than any other institution.

I separate the studies into three categories for analysis. The first, and the largest, category includes studies which examine variables presumed related to the effectiveness of microteaching. The forty-nine studies in this category considered the effects on microteaching of variables such as the source of feedback (pupils, peers of the trainee, a supervisor, audio tape, or video tape), the practice conditions (kind and number of pupils, length and frequency of lessons, and the kind of lesson being taught), and the kind of modeling used to present the trainee with an example of the teaching skill (filmed or live, complex or simple, filmed or written).[5]

The second set includes 12 studies that compare the effectiveness

[5]The number of studies in the categories exceed the total number of studies (sixty-nine) because several studies have multiple purposes and fit more than one category.

of a microteaching program to some other approach. The question these twelve studies seeks to answer is summarized as: "Does this particular microteaching program or program X - usually a traditional student teaching program - do a better job of training teachers in the application of certain classroom skills?" The research design commonly used in the studies in this category is one which Campbell and Stanley (1963) term the "pretest-Posttest control group design" where equivalent groups made equivalent by randomization are given different treatments following a pretest, and the relative effectiveness of the treatments is assessed using gain scores on the posttest over the pretest.

The third set of 15 studies are attempts to assess the effectiveness of microteaching programs using pre- and posttests without comparison groups. Most of these studies fall into Campbell and Stanley's (1963) "one-group pretest-posttest quasi-experimental design." The question these studies attempts to answer is: "Does microteaching result in significant increases in teachers' performance of classroom skills?"

Problems Common to the Studies

The research on microteaching is characterized by many of the problems common to other research on teaching, making it difficult to draw conclusions. Three major problems -- description, measurement, and interpretation -- contributed to the confusion.

First, consider the problem of description. In most of the studies on microteaching a microteaching program or some component of it is the independent variable in an experiment. All microteaching programs differ from others to some extent, as they vary in the skills, subjects, teaching level, content area, etc. they deal with. Unfortunately, the descriptions of the independent variables, microteaching programs and the courses to which they are being compared, are often too sketchy for readers of the research reports to interpret the data meaningfully and generalize to other settings.

The second problem this review of microteaching research revealed was an almost universal lack of reliable, valid, and precise criterion measures of teacher or student performance. Rosenshine (1971) indicates that instruments used to observe classroom instruction can be classified as either rating systems or category systems. Rating systems are used to estimate various dimensions of a teacher's or student's behavior on a scale, usually five to seven point scale. The scale may be descriptive estimates of behavior, but some rating scales operate on such dimensions as "poor" to "superior." Category systems involve the observer in the counting of the relevant behaviors whenever they occur. Rosenshine (p. 19) points out that, "Observational systems can also be classified according to the amount of inference required of the observer or the person reading the research report. The term 'inference' refers to the process intervening between the objective behavior seen or heard and the coding of this behavior

on an observational instrument." Category systems, which must focus on relatively specific and definable behavior, usually can be classified as low-inference measures. Rating systems generally lack the specificity of low-inference measures and thus can be classified as high-inference measures. Items on rating forms require the observer to infer frequency, intensity, or quality of teacher or student behavior.

Most of the criterion measures used in microteaching studies were rating scales that require high inference by the observer and the reader. Even when observers achieve respectable agreement on ratings, their ratings are difficult to interpret since the rating form items are often too gross and general to be meaningful, making it difficult for the reader to know precisely what conceptions the raters apparently agreed upon.

A few of the studies use category systems which require considerably lower level inference by observer and reader and appear to measure the behavior of interest to the researcher.

Another problem related to measurement was that some researchers used measures not clearly related to the specific skills toward which the programs were aimed. For example, Cooper & Stroud (1967) discuss a program that resulted in statistically significant changes on the criterion measure, but left the researchers with a weak case for claiming evidence of the specific behavior changes they desired.

Virtually all of the specific category systems coded teacher behavior in terms of the kind of behavior ("questioning," "praising,"

"presenting," etc.) rather than by the quality of the behavior. Thus a poorly phrased "higher order question" would be scored the same as a clearly phrased one. A "probing question" offered at an appropriate moment in a discussion would be scored the same as a "probing question" used needlessly (and perhaps absurdly). In other words, behavior change in most studies was measured by the frequency of occurrence of specific behaviors, not by the frequency of appropriate occurrence. More will be said about the criterion problem later.

The third problem, interpretation of data, has been a common curse in microteaching research. The data has been hard to interpret for several reasons. The lack of good measures of teacher performance certainly confounded researchers. Several studies were severely handicapped by a failure to establish the equivalence of groups used in the experimental designs, thus making it difficult or impossible for the investigator to rule out the presence of some undetected but systematic difference between groups that could bias his data. Neither is the purpose of interpretation aided by relative lack of theory in many microteaching studies. In fact, many investigators appeared to conduct research oblivious to related studies. Microteaching studies cited in literature reviews are frequently superficial and occassionally inaccurate. Perhaps that is indicative of the interpretation problem in this body of research.

Criteria Used in This Analysis

Two ground rules governed this review of microteaching studies. First, primary attention was given to studies that were directly relevant to microteaching's effectiveness as a teacher training tool -- those studies that tried to assess teacher performance improvement brought about by a microteaching program. I have called these studies "microteaching effectiveness studies." Another set of studies, those on specific microteaching variables, were reviewed in order to make better judgments about the extent to which a microteaching program's effectiveness is dependent upon specific variables. The abundance and complexity of such studies would have made a thorough review of them too lengthy for this paper. For that reason microteaching variables research will receive secondary treatment.

The second ground rule applied to the studies in this review was to look at each study in terms of the validity of the investigator's interpretations. Campbell and Stanley (1963, p. 5) made a distinction between internal validity and external validity:

> Internal validity is the basic minimum without which any experiment is uninterpretable: Did in fact the experimental treatments make a difference in this specific experimental instance? External validity asks the question of generalizability: To what populations, settings, treatment variables, and measurement variables can this effect be generalized?

Primary emphasis was given to the examination of studies in terms of their internal validity. If studies did not provide firm bases for ruling

out alternative hypotheses, their findings were suspect. The judgments on studies' internal validity are interwoven in the reviews of the studies. Statements about the external validity of the studies fall at the end of the research review.

Analysis of the Research

Research on Microteaching Variables

Although this analysis gives primary attention to microteaching effectiveness, it also considera research which focused on variables that may mediate the effectiveness of microteaching programs. A preliminary review of these studies may serve as a means of understanding some of the complexities of microteaching as a training technique.

Among the variables that researchers have hypothesized are important in microteaching are the following: (a) modeling, (b) practice conditions, and (c) feedback conditions.[6] The basic research question in these studies was, "What effect will variable X have on the performance of trainees on specific classroom skills?" For example, a study might compare the teaching performance of teachers who had been exposed to audio tape feedback with the performance of teachers who used video tape feedback.

[6] The quality, organization, and substance of the written and recorded content of the microteaching program could also be considered important to the effectiveness of microteaching. I did not make reference to such studies because they add little to my argument that a microteaching program's success in contingent on several variables.

Although I have not analyzed the variables research as exhaustively as the general microteaching effectiveness research, my analysis suffests that certain variables are critical to the effectiveness of microteaching. Borg et al. (1970) give a more detailed analysis of research on variables that influence the microteaching process.

Studies of modeling indicate that the kind of example or teaching "model" used to acquaint trainees with the specific teaching behavior to be learned is an important variable to the effectiveness of a microteaching program. Two types of models, "perceptual" and "symbolic," are frequently used prior to the teach-critique-reteach cycle. Perceptual modeling refers to a video-taped teaching episode which exemplifies and/or dramatizes a specific teaching behavior. "Symbolic" modeling is simply a written description and explanation of a specific teaching behavior (Young, 1969).

Young (1968), examining the effect of various kinds of modeling on trainees' learning redundancy skills used in lecturing, reported that the most effective modeling was a combination of perceptional models showing specific, dramatized illustrations of the behavior and a model showing the specific behavior in the context of a lesson with remarks dubbed on the tape to aid the trainee in discriminating.

Allen et al. (1967) reported that for questioning skills symbolic models appeared as effective as perceptual models. Models showing only the positive instances of the behavior to be learned seemed to be the most successful in helping the trainees to transfer the skills to new lessons.

Berliner (1969) reported also that for higher order questioning skills perceptual modeling was not more efficient than symbolic modeling. The modeling of "pure" or positive instances of a behavior resulted in the greatest transfer to new lessons. Verbal reinforcement and discrimination, or verbal identification, by the supervisor of the desired behavior seemed to optimize the model's effectiveness. Orme (1966) found that a combination of symbolic and perceptuals were superior to either or none in the acquisition of the skill of asking probing questions.

The practice conditions under which teacher trainees use specific teaching skills is a second variable in that practice conditions are subject to numerous manipulations by microteaching programers. Studies which compared the effect of using either college students, trainees' peers, or elementary and secondary students as pupils in microclasses have failed to demonstrate the superiority of condition in terms of trainees' performance (Johnson & Panciazio, 1971; Collofeilo, 1970). McDonald and Allen (1967) found no difference in teachers' performance whether they taught on intervals of days (1, 3, 7); (1, 7, 14); or (1, 14, 28). Goldwaite (1968) found that trainees may require more than one reteach in order to demonstrate marked improvement in giving science demonstrations. It is fair to say that research has not found the optimal practice conditions for the acquisition of specific teaching skills. Research in that area has been scarce and generally inconclusive.

Thirty-two of the studies reviewed dealt with the effect of various kinds of feedback on the microteacher's subsequent teaching behavior. Theoretically some kind of feedback supplemental to the analysis of the first "teach" in the teach-critique-reteach cycle is an essential component of the microteaching structure. The purpose of the feedback is the modification of a trainee's behavior in a prescribed direction. Much of the theory and methodology of microteaching feedback is grounded on notions of reinforcement learning and operant conditioning:

> Reinforcement of desirable teaching behaviors and the concentration of the trainee upon perfecting them often result in the unconscious extinction of undesirable or ineffective practices . . . . The learner receives immediate reinforcement or feedback regarding his particular behavior. This is essential for optimum classical or operant conditioning (Meier, 1968, p. 149).

The research on feedback in microteaching is generally concerned with the source of the feedback, i.e., peer, supervisor, self, recorded, rather than with the kind and substance of information related to the trainee by the feedback source. Comparisons of the effectiveness audio tape feedback against audio/video tape feedback have universally failed to demonstrate a clear difference in terms of teacher performance (Leonard, 1971; Gall et al., 1971; Boone & Stech, 1970; Hiscox & Van Mondfrans, 1972; Kiser et al., 1969). Video recording has been found to result in teachers' concentrating on the cosmetic features of their appearance and on personal mannerisms rather than on cognitive aspects of their teaching performance (Solomon & McDonald, 1968; Nielson, 1962).

Morse et al. (1970), using two weeks of microteaching with audio feedback, and Bern (1967), using video feedback, found no improvement in teachers' performance, suggesting limited audio or audio/visual feedback does not insure changes in teachers' performance. The studies of recorded feedback may be related to other sources of feedback in that the recordings can be used by a teacher for self-evaluation or with a supervisor in other arrangements. Teacher self-evaluation, using video or audio feedback, has generally been found to be as effective or more effective than feedback given by a supervisor (Acheson, 1964; Adair & Kyle, 1969; Claus, 1968; Orme, 1966). The interpretation of these studies is not clear-cut, and one study is not consistent with the others (McDonald & Allen, 1967). Thus the interpretation of the reporting of the findings that follows should consider that restriction.

Yound (1970) found that supervision and feedback on a trainee's teaching performance by a team of the trainee's peers resulted in a significantly greater number of behavior changes in the microteacher than with supervision by a single superior.[7] A study of 286 teachers (Tuckman and Oliver, 1968) comparing the effects of feedback from (1) students only, (2) supervisor only, (3) both, (4) neither, found that student feedback alone led to significant positive changes in teacher

[7] The kind of supervision varies from one supervisor to the next and from one program to the next.

behavior. Supervisor feedback alone led to changes in the opposite direction from the feedback. Supervisor and student feedback combined effectual behavior change the same as with students alone. The no feedback situation resulted in no discernible behavior change. Shively et al. (1970) also reported that supervision feedback based on students' ratings and evaluations of the teaching performance in a microteaching lesson on lecturing skills is effective as altering a trainee's teaching behavior in a positive direction. Orme (1966) and Claus (1968) suggest supervisor feedback adds little to teacher performance when video feedback and perceptual modeling are used.

It is difficult to draw definitive conclusions from the research on microteaching variables. There are large gaps, inconsistencies in cases, lack of reference to theory (with the exception of modeling). Research on practice conditions is inconclusive. No studies found T.V. to be superior to audio tape as a feedback devise. Considering the wide-spread usage of video tape in microteaching programs, despite its high financial cost and technological headache, microteaching programs apparently are unaware of the lack of empirical support of video taping or have more faith in their own intuition. On the other hand, the "no significant difference" in audio tape vs. video tape studies could be another of its problems which Schueler & Lesser (1967) contend plague media research.

Supervision feedback, as conceived in microteaching model, has little empirical support. Pupil feedback, audio tape and video tape self-evaluation and peer feedback appear to result in significant changes in teachers' performance.

Microteaching Effectiveness Research

Studies That Used "Control" Groups. The fifteen studies in this category utilized a "pretest-posttest control group" experimental design (Campbell & Stanley, 1963). The microteaching programs represented secondary and elementary teachers, several subject matter areas, several teaching skills, a variety of microteaching formats, and occurred in various contexts (educational psychology courses, methods courses, student teaching, and in-service workshops). About half of the studies used relatively high inference rating systems as the criterion measures, and about half used category systems, four of which were Flanders-type interaction analyses.

Only five of the fifteen studies (Bush, 1966; Suffolk County Regional Center, 1971; Gall et al., 1972; Werner et al., 1972; Young & Young, 1969) indicated the microteaching programs studied resulted in teacher behavior changes superior to those observed in the control, or comparison, group.[8]

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[8] The term "control group" does not merely signify an equivalent group having an absence of microteaching. In fact, the control groups have some form of teacher training as content, such as a traditional practice teaching program.

The analysis that follows focuses on two studies that are representative of the findings and problems of all five of these studies. The first study, carried out at Stanford University, has been used to support the effectiveness of microteaching; the second study fails to support the superiority of microteaching in another program. The report of the 1963 and 1964 microteaching clinics for secondary education intern candidates at Stanford University's School of Education are important to examine because they are commonly reported as evidence of the effectiveness of microteaching, and because from an experimental viewpoint the Stanford studies are stronger than many.[9]

The sixty interns enrolled in the 1963 summer program at Stanford were randomly assigned to either the microteaching froup or to the group which would participate in Stanford's pre-internship experience that consisted of observation and teacher aide experiences in a secondary school classroom.

Fortune et al. (1967) and Cooper and Allen (1970), reporting on the 1963 and 1964 eight-week summer microteaching clinics for intern candidates, claim that trainees exposed to the microteaching clinics performed selected teaching skills significantly better than control group trainees. Prior to the 1963 and the 1964 summer sessions, all Stanford

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[9] Two "control" studies (Werner et al., 1972 and Gall et al., 1972) are considered in the following section rather than here because they are part of a body of research that is treated in detail in that section.

pre-intern students were randomly assigned to the microteaching clinic or to the normal pre-intern summer program. The microteaching individuals spent an average of ten hours a week receiving instruction in the selected skills chosen as the focus for the clinic, teaching to groups of four students (from local high schools) and a supervisor (Stanford doctoral students in education), being critiqued and reteaching to new students.[10] The skills emphasized in the clinics were: (a) establishing set, (b) achieving closure, (c) recognizing attending behavior, (d) controlling participation, (e) building instructional alternatives, and (f) disciplining a class. The non-microteaching group spent an average of twenty-five hours a week assigned to teachers in local high schools for observation and limited teaching experiences and on-campus instruction and theory about the teaching skills emphasized in the microteaching clinic. The teaching performance of the two groups was compared using ratings of five minute video taped diagnostic lessons taught by each trainee at the beginning and end of the summer session. The raters used a rating system, the Stanford Teacher Competence Appraisal Guide (STCAG) to assess the pre- and post-course teaching performance of both groups.

The pupils in the microclasses scored an adaptation of the STCAG on their teachers' performance. Those ratings were used in addition to

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[10] The amount of time spent by trainees planning for microteaching specific lessons each week was not reported. I suspect a considerable amount of time was spent in preparation of lessons.

video and supervisor feedback during the critique sessions.

The STCAG, as used in much microteaching research, consists of eleven to twelve semi-independent items which are scored on a forced-choice, seven interval scale ranging from "weak" to "truly exceptional." The items include: (a) Clarity of Aims; (b) Appropriateness of Aims; (c) Organization of the Lesson; (d) Selection of Content; (e) Selection of Materials; (f) Beginning the Lesson; (g) Clarity of presentation; (h) Pacing of the Lesson; (i) Pupil participation and Attention; (j) Ending the Lesson; (k) Teacher-Pupil Rapport; (l) Variety of Evaluative Procedures.

The STCAG appears to measure overall teaching performance in terms of the teacher's planning, presentation, and evaluation of a lesson. The scoring of items on the STCAG requires a high degree of inference by the rater. Interpretation of scores on the STCAG is difficult even when raters' scores are highly correlated. The reader can never be certain of the operational definitions of the items used in the scoring, nor can he be sure that different investigators used the STCAG in precisely the same way.

Aside from the issue of whether the STCAG is a reliable instrument, it appears doubtful that the STCAG is an appropriate criterion measure of teachers' performance of the specific teaching skills emphasized during the microteaching program. Fortune et al. (1967) questioned the validity of the STCAG as a measure of specific teaching skills for a more specific

criterion measure. In addition to lacking specificity, the items on the STCAG do not clearly correspond with the specific teaching skills emphasized in the Stanford programs (listed on p. 22 in this paper). For example, which item(s) on the STCAG would be a good measure of a teacher's skill in asking "higher order questions," "divergent questions," "reinforcing of student participation," etc.?

Using the STCAG to measure teaching performance, Fortune et al. (1967) and Cooper and Allen (1970) reported the microteaching groups in the 1963 and 1964 sessions rated statistically better at the 0.05 level of significance on each skill taught over the course of the summer than control groups. Despite relatively high interrater reliability coefficients, in excess of .80, it is difficult to interpret the results because of the global nature of the measure. Perhaps the gains registered on the STCAG by the microteaching group were indicative of overall improvement of teachers' performance and not necessarily improvement in the specific skills emphasized in the clinic. If that was true, it was important, but it did not yield much evidence regarding specific skills. The results of comparing the microteaching group to the non-microteaching group are also hard to evaluate because the research reports did not adequately describe the kind of program the non-microteaching group was exposed to. It is possible that the microteaching individuals simply did more actual teaching and had better trained supervisors than did the other group.

Another plausible explanation of the microteaching group's superiority is that they were more accustomed to teaching short lessons in front of a video recorder, by virtue of their experience in the microteaching clinic. The experimental design did not control that variable. Thus, the doubtful validity of the criterion measure and the failure of the research design to control all important variables raise serious questions about the meaning of the studies.

The second study reviewed in the control group category is one that failed to confirm the Stanford claims of microteaching's superiority over a comparison group. Kallenbach (1967)(also Kallenbach & Gall (1969) reporting on the same study) compared the teaching performance of forty first-year elementary interns who had been randomly assigned to two different pre-internship clinical training programs. Twenty interns were involved in a six-week microteaching clinic the summer prior to their internship. The microteaching, similar to the Stanford model (10 hours per week, for 5 weeks), was done on campus. The other twenty interns were assigned to individual public school teachers for observation, teacher aid, and some supervised teaching experience the summer prior to their internships. Otherwise the two groups had similar professional training. Blind, random ratings, on the STCAG and the Instrument for Evaluation of Teaching Activities (IOTA, a 27 item rating form using a five point scale), on individual intern's teaching competence were made

four times: (a) prior to any training in the summer; (b) at the end of the summer session; (c) in the interns' classes in the fall during the first year of teaching (doing live teaching in the public schools); and (d) in the spring of the interns' first year of teaching. No significant differences were found between the teaching competence of the two groups on the last three evaluations. In fact, the pre-summer to post-summer gains of all groups was generally of smaller magnitude than 1963-1966 Stanford gains.

The pre-test evaluation indicated the control group possessed statistically significantly better teaching performance than the microteach group ($p<0.05$), yet that finding may be discounted since the interrater reliability was very low on the first measurement. If we assume the random assignment of individuals to the two groups assured reasonable equivalence of the two groups, the study suggests microteaching may be no more effective than less structured supervised teaching experiences.

Kallenbach interpreted the results to mean that the microteaching program, which he waid required 80% less of students' time than the student teaching program, is equally as effective as student teaching and less time-consuming. Another way to look at the data is to say microteaching may be equally as ineffective as the student teaching and observation program. Alternative explanations for the non-significant difference are possible. One is that perhaps the STCAG and the IOTA were not

sensitive measures of specific changes in teacher behavior and thus could not discriminate between the two programs. Another explanation of the apparent inconsistency with the 1963-1964 Stanford programs could be found in major differences between the Kallenbach's program and those at Stanford. Stanford's microteaching was for secondary teachers and focused on a few specific teaching skills. On the other hand, Kallenbach's microteaching program was for elementary teachers and the teaching skills emphasized were less specific (lesson preparation, presentation, and teacher-pupil rapport) than were the Stanford skills (see p. 22). None of the interpretations can be considered clear evidence of the effectiveness of Kallenbach's microteaching program.

Studies That Used no Comparison Groups. Fifteen studies reviewed here used no comparison groups against which to compare microteaching programs. Instead, the programs were judged on the basis of changes observed in teacher behavior during the course of the microteaching. Typically the studies conform to the quasi-experimental design Campbell & Stanley (1963) call the "one-group pretest-posttest design."

The "one-group pretest-posttest design" involves a treatment group which is measured in terms of a specified criterion before and after the treatment, a microteaching program in this case, is administered. The observed changes from the pretest to the posttest are attributed to

the treatment. Campbell & Stanley (1963) point out that the experimental design fails to account for several extraneous variables that could account for at least part of the observed changes and hence is weak in terms of internal validity. In particular, the effect of testing or measuring teacher behavior is not clear in most microteaching studies. It would seem that placing observers or a video tape recorder in a classroom to measure a teacher's performance would be, to some degree, a stimulus to change apart from the effects of the microteaching program.

Four of the fifteen relied on highly subjective data and will not be analyzed here.[11] The reporting of one (Douglas and Phieffer, 1971) was too sketchy to analyze. Two of the studies were evaluations of the 1965 and 1966 summer microteaching clinics at Stanford University (Fortune et al., 1967; Cooper & Stroud, 1967). This analysis includes those studies for the same reasons mentioned earlier about the 1963-1964 Stanford microteaching clinics.

The 1965 Stanford Clinic (Fortune et al., 1967) in general replicated and affirmed the findings of the two previous clinics, yet no control group was used. The microteachers as a group obtained statistically significant higher ratings on nine of the thirteen items on the STCAG

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[11] A study by Codwell (1969), because of severe variations from the microteaching model, can not be considered to be a true test of microteaching. For that reason I will not analyze the Codwell effort in detail.

rating of five-minute deagnostic video taped lessons at the end of the six weeks compared to the pre-clinic ratings on the STCAG. (The ratings were computed using the ratings of the supervisors and the mean of the microclass pupils' ratings on the STCAG.)

The pupils' (the high school students who comprised the microclasses) ratings of a trainee's microteaching performance generally indicated less behavior change than those of the supervisors. Fortune et al. (1967) speculated that supervisors tended to rate microteachers higher on the "reteach" performance when the microteachers implemented the suggestions of the supervisor in the second lesson. They also speculated that since the pupils being taught in the "reteach" were always new to the lesson and were not privy to the suggestions made to the microteacher in the critique session, their ratings of the lessons tended to be lower on the "reteach" than the rating of the supervisor. The supervisor ratings, without the microclass pupils' ratings, were significant in all thirteen items. The supervisors' ratings on the average indicated about a one point gain from "average" to "strong" on the STCAG. As I argued earlier, it is difficult to relate the STCAG gains to the specific Stanford teaching skills.

Cooper & Stroud (1967) attempted to evaluate microteaching at the 1966 Stanford summer session. The basic organization and substance of the microteaching program remained the same as in the three previous

clinics. The criterion measures for assessing teacher performance of the 135 pre-interns were the STCAG and the Technical Skills Instrument (TSI). The TSI was developed specifically to measure performance of particular technical teaching skills. The structure and coding of the TSI is similar to the STCAG, but the categories on the TSI vary according to the skill being emphasized. The TSI items appear to be more closely related to specific skills than does the STCAG. Unfortunately, the raters in the 1966 clinic were never able to achieve acceptable interrater reliability on the TSI. Data using the STCAG as the measure indicated a statistically significant gain, over the course of the clinic, in eleven of the thirteen items on the STCAG. In general, Cooper and Stroud reported statistically significant gains over four lessons taught in each skill (teach/reteach of lesson one and teach/reteach of lesson two).[12] One must consider the study's findings in the light of the limitations of the STCAG.

The best source of evidence of microteaching effectiveness are recent studies carried out by the Stanford Center for Research and Development in Teaching and by the Teacher Education Program of the Far West Laboratory (Borg et al., 1970). These studies have attempted to identify variables that affect the degree of change in teachers' use of skills and to evaluate the effectiveness of "minicourses," self-instruc-

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[12] Skills focused on were: (1) reinforcement, (2) varying stimulus, (3) set induction, (4) lecturing and use of AV, (5) illustrating, (6) closure, and (7) student-initiated questions.

tional adaptations of the Stanford microteaching model, in changing teachers' behavior. Extensive and systematic research and development effort went into the building of the minicourses, and the final minicourses discussed here purportedly incorporated existing knowledge on the effects of the same variables I discussed earlier in this paper. The minicourse instructional model differs markedly in only one respect from the Stanford microteaching model. The minicourse model emphasized self-feedback, via the video tape recorder, whereas the Stanford model utilizes supervisors for feedback in critique sessions. The minicourse model has no equivalent to a supervisor because the Far West Laboratory researchers found no compelling evidence to justify the administrative and financial cost of using supervisors.

If we accept the assumption that supervisors feedback is not a critical aspect of the microteaching, when video or audio playback and adequate models of teaching behavior are present, then the minicourse represents one of the "best" examples of microteaching. For that reason I will analyze carefully the main field tests of the first four minicourses.

The minicourse model, which is an adaptation of the Stanford microteaching model, is primarily used in in-service training and consists of a three-step training sequence. In the first step the teacher views a video-taped lesson which describes and illustrates one to three specific teaching skills, following which the teacher views a brief

videotaped lesson which shows a model teacher using these skills in a microteaching situation. This lesson is intended to provide the teacher with a clear and specific example of how each skill can be used in a brief lesson and at the same time help the teacher discriminate among the skills as they occur. As the lesson progresses, the teacher is called upon to identify each skill as it occurs. He receives immediate feedback on the correctness of his identification.

The second step in the minicourse model calls upon the teacher to plan and teach to four to eight pupils[13] a brief lesson that will utilize the skills emphasized in the instructional and model tapes. This lesson is recorded on videotape and replayed by the teacher upon its completion. He analyzes his teaching behavior using special evaluation forms that focus on the specific teaching skills in question.

In the third step of the minicourse model the teacher replans the microteach lesson and reteaches it to another group of pupils. The reteach lesson is also recorded and is used by the teacher to evaluate his performance during the replay of the tape.

Three seperate field tests are made of each minicourse prior to its final publication. The most relevant field test to this review is the

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[13] The pupils are usually drawn from the teacher's regular class while a substitute supervises the rest of the class.

main field test which is used to gather quantitative data on the effectiveness of the minicourse in achieving its objectives, i.e., whether it brings about the desired levels of change in teacher performance (Borg et al., 1970). The main field test involves administering the minicourse to a group of between thirty and seventy-five teachers. Ratings via videotape recordings of each teacher's classroom performance are made shortly before he starts the minicourse and shortly thereafter. A few of the minicourse field tests made use of a delayed postcourse videotape made several months after completion of the course.

Individual field tests differed slightly with respect to the number and grade level of teachers, the socio-economic status of the school, and the length of pre- and post-course evaluation tapes of teachers' performance. For that reason a separate analysis of each main field test makes sense. The main field test of Minicourse 1, "Effective Questioning" (Elementary Level), will be considered first.

Minicourse 1 was designed to bring about changes via four minicourse sequences in twelve areas of teacher behavior in conducting discussion lessons.

Minicourse 1 was taken by forty-eight teachers from twelve elementary schools in six school districts. One school in each district served a "middle-class" neighborhood, and one school served a "working-class" neighborhood (Borg et al., p. 73, 1970). The teachers were evenly distributed among the fourth, fifth, and sixth grades and had an

average of nine years' teaching experience. Only four were first-year teachers.

Lab investigators got data on the level of teacher behavior changes by randomly and double-blind scoring three twenty-minute videotaped lessons -- pre-course, post-course, and post-course delayed -- of the teaching performance on 13 categories in a regular classroom of each teacher in the sample. Interrater reliability coefficients ranged from 0.60 to 0.98 (Borg et al., 1970).

The comparison of the pre-course to the post-course means indicates statistical significance on all but items 6 and 12. The magnitude of change on most of the remaining items suggests practical as well as statistical difference between the observed performances of teachers.[14]

Borg et al., (1970) found little evidence to suggest that the grade level or socioeconomic differences included in the sample influence the magnitude of change in teacher or pupil behavior. Unfortunately, their sampling procedures did not permit them to assume that the classes and teachers were comparable prior to the course. Thus one cannot be certain that a fifth grade class in a "working-class" school is comparable to a fifth grade class in another "working-class" school.

Four months after completing the minicourse, teachers recorded another twenty-minute lesson under the same instructions as in the first

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[14] By "practical significance" I mean that the difference attributable to a program would be of a magnitude that policy-makers would give serious consideration.

pre- and post-course evaluation lessons. The comparison of the delayed post-course lessons with post-course lessons given immediately after teachers completed the minicourse indicated that the frequency of the specific teacher behaviors emphasized in Minicourse 1 remained the same or improved in all but one category.[15]

Minicourse 3, "Effective Questioning in a Classroom Discussion, Secondary Level," focused on the specific teaching behaviors: (a) calling on non-volunteers as well as volunteers; (b) reducing teacher behavior that interferes with class discussion such as repeating own questions, answering own question, repeating students' answers; (c) probing for more thoughtful responses from students; (d) increasing teacher's use of higher cognitive questions (Borg et al., 1970, say that this was the major objective); (e) increasing teacher's use of higher cognitive questions to elicit more thoughtful responses to these questions (prompting, calling for further clarification, and redirection) (Borg et al., 1970).

Seventy-four junior and senior high school teachers from San Francisco and northern California took part in the main field test of Minicourse 3. The evaluation design was similar to the tests of the earlier minicourses. One variation in this field test was that the

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[15] A study of pre-service teachers who took Minicourse 1 in conjuction with student teaching resulted in little observable superiority over student teachers who did not take the minicourse (Borg et al., 1969).

teachers were given, prior to planning the pre-course lesson, a handout that listed and defined all of the skills to be covered in the evaluation of the lesson.

On the post-course lessons teachers showed an increase of 22 percent of "higher cognitive questions" (questiong that require more than fact recall by the student). The percentage is gifured by dividing the number of higher cognitive questions by the total number of questions asked by the teacher. The interesting thing about the increase was that the number of higher cognitive questions did not increase. Instead, teachers simply asked less fact questions, thereby increasing the percentage of higher cognitive questions. Gall et al. (1972) reported a similar finding in the main field test of Minicourse 9, Higher Cognitive Questioning. The mean length of pupil responses to questions rose from 10.89 to 14.04 seconds. Only the "answering own questions" category of teacher interferring behavior failed to decrease significantly ($p < .05$). The mean of "Repeating pupil answers" dropped from 10.84 to 4.42 in the thirteen-minute lessons (Borg et al., 1970).

Minicourse 2, "Developing Language Skills, " was developed to improve "Teaching skills that lead to language-learning by kindergarten children with minimal language background" (Borg et al., p. 117, 1970). Fourteen teaching skills were drawn from the following five skill areas

of language development: (a) extending phrases to complete sentences, and refining meaning; (b) establishing and using new language patterns; (c) using language to describe position; (d) using language to describe and classify objects; (e) using language to identify and describe action.

Forty-seven kindergarten teachers from communities of black and white migrant and Mexican-American families in California and an urban black Pennsylvania community took part in the main field test of Minicourse 2. Comparisons of pre-course to post-course frequency of specific teaching skills during ten-minute lessons with five pupils indicated statistically significant changes in eleven of the fourteen skills ($p < .05$). The desired increase or decrease of occurrances of about half of the behavior could be considered of practical significance as well.

Two of the main field tests of the minicourses tested to date have utilized comparison or "control" groups of teachers. In one of the tests there was no firm basis for assuming the pre-course comparability of the control group of teachers to the group participating in the minicourses (Gall et al., 1972). Werner et al. (1972) reported on the main field test of Minicourse 20, "Divergent Thinking." Fifty-nine in-service English and social studies teachers who volunteered for the study were assigned randomly to the minicourse or the control group. The minicourse teachers took Minicourse 20, which was developed to improve teachers' techniques in using brainstorming to stimulate divergent thinking in students. The teaching behaviors of interest were: (a) decreasing the amount of

evaluation by the teacher during brainstorming; (b) decreasing the amount of "unnecessary teacher talk" during brainstorming, i.e., repeating the student answer just given, repeating the brainstorming question, engaging in chit chat, engaging in directive talk attempting to shape or clarify student responses, etc.; (c) increasing teachers' use of techniques that stimulate divergence if the brainstorming lags, i.e., use of analogies and sub-questions, suggesting possible catagories of answers, etc.

The control teachers received no experimental treatment other than teaching the twenty evaluation lessons required of all teachers.

Tapes of the twenty-minute brainstorming sessions made before, after, and seven weeks after the minicourse ended showed that the minicourse group improved significantly ($p < .005$) over the control group in the area of not "evaluating" and not "making unnecessary comments," but not in "using techniques to stimulate divergence" (Werner et al., 1972).

Werner et al. (1972) do not report whether the control teachers were even supplied with a list and definitions of the skills covered in the evaluation of performance as in the Borg et al. (1970) report of the main field test of Minicourse 3. Perhaps the reason for the improvement in the "evaluation" and "unnecessary comments" areas was due to the relative simplicity of those behaviors. If the control teachers were unaware of the categories to be rated, their teaching could not be

expected to automatically reflect those skills. At any rate, the data were suggestive of the greater complexity of the teaching skills in the "techniques to stimulate divergence" area.

A thorough analysis of the minicourse field tests reported here should examine evidence of internal and external validity prior to summarizing the findings of the studies. If the studies were seriously deficient in terms of internal validity, the findings could be erroneous and misleading. Most of the evidence on the effectiveness of the minicourses was derived from studies that used the "one-group pretest-posttest design," a quasi-experimental design that fails to control all extraneous variables, thus making interpretation of the data difficult (and jeopardizing internal validity). The effect of video taping lessons remained largely unknown during minicourse field tests. The field test of Minicourse 3 (Borg et al., 1970) seemed to rule out the alternative explanation for minicourse behavior change, that is that the pretest scores on teacher performance were unusually low because teachers were not aware of the specific categories of skills covered in the evaluations of the pre-course lessons. However, that field test did not indicate whether the alternative explanation could be similarly ruled out for minicourses that focus on different kinds of teaching skills.

On the plus side, measurement of teaching performance in the minicourse field tests was based upon rather low inference category

systems that were derived directly from the specific teaching skills covered in individual minicourses.[16] Rating procedures and interrater reliability were universally adequate.

Summary of Findings

My analysis reveals that the research on the effectiveness of microteaching is inconclusive, at least in part because of the problems noted in the "Problems" section of this paper, and incomplete. The Stanford studies cited appear to support microteaching's effectiveness for pre-service secondary teachers, yet it is inconsistent with the Kallenbach (1967) study. In both cases the criterion measure of specific teaching skills was deficient.

The minicourse field tests, which one may assume represent a test of the microteaching model, produced enduring, statistically significant, and practically significant changes in teacher behavior with experienced teachers, volunteers for the study, in a variety of socio-economic school settings and for grades 1-12. A pre-service test of Minicourse 1 yielded no observable gains. One might offer alternative hypotheses for the pre-service failure, but the fact remains that the microteaching model lacks clear-cut evidence of effectiveness at the

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16 The categories measured frequency and length of occurrance of specific skills. As in most microteaching studies, the quality and appropriateness of teacher behavior was virtually ignored by the category systems.

pre-service level.

The external validity of microteaching studies, like much research on teaching, leaves much to be desired. Nevertheless educational policy-makers can make some rational judgments about the generalizability and replicability of microteaching results in settings other than ones in which they were tested. These judgments can be made by gathering as much data as possible relevant to the specific kinds of programs and the conditions under which they were tested. For example, the minicourses were tested and received favorable results, in a variety of school settings.

Important Issues and Unknowns

Much remains unknown about the process and outcomes of microteaching, as is evidenced by this review and by persons close to microteaching research and practice:

> Our evidence to date, although it reveals much about the parameters of our model, also leaves many questions unanswered. None of our observations about the capacity of the minicourse model to change various kinds of behavior has held in every case. Thus, it seems likely there are variables operating that we have not yet identified. At the present, we have a very limited understanding of why the minicourse succeeds or fails. (Borg et al., 1970, pp. 114-115)

From an educational policy-making viewpoint, this analysis has only scratched the surface of issues important to the consideration of microteaching as a teacher training methodology. Two classes of

issues remain to be resolved. One class concerns the refinement of the microteaching process in order to maximize its effect on teachers' performance of the target skills. Some of the unanswered questions in this class concern the following: (a) the kinds of models used to demonstrate specific teaching behaviors, (b) the number of teach-reteach cycles, (c) the length of the lessons, (d) the time lapse between the teaching and feedback, (e) the kind of feedback used, and (f) the number of teaching skills incorporated in a single lesson. Borg et al. (1970) and Sadler and Cooper (1970) suggest several important unresolved questions regarding the refinement of the microteaching model.

The second and much broader class of issues concerns the appropriateness of the microteaching model to the training of teachers. It is with the appropriateness issue that this section of the paper will deal. It is not my purpose to argue for a particular model of teacher education. Instead, I hope to identify and clarify a few issues worthy of reflection by policymakers who are considering the appropriateness of the microteaching model to their teacher education programs.[17]

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17 When considering the appropriateness of an educational product or program such as microteaching, potential consumers have a tendency to immediately ask whether the program "works" or is "effective." Unfortunately that question can not be easily answered because the terms "appropriate" and "effective" imply intentionality and thus include normative as well as empirical issues. In order to answer such questions one must be able to specify what things ought to be the case and what things are actually the case. It would be meaningless to say that microteaching was an appropriate means of training teachers unless one has some notion of what should be the nature of teacher education and unless one has good reason to believe that microteaching will have the effects intended.

At the risk of duplicating earlier parts of this paper, I will examine three of the following empirical assumptions upon which the microteaching model appears to be based: (a) teaching tasks can be analyzed and reduced to specific operationally defined "skills"; (b) mastery of these "skills" increases the probability of becoming an effective teacher; (c) these skills are trainable via a microteaching program.

Reducing Teaching to Specific Skills

First, consider whether teaching is an activity which can be reduced to an array of specific skills or instructional techniques which a teacher may use in specific situations, and soncider whether mastery of these skills increases the probability of successful teaching. A brief look at some of the literature on teaching indicates that teaching has been conceptualized in many diverse ways; nevertheless, my review suggests at least two generalizations about teaching which are salient to the discussion of microteaching.

The first generalization is that teaching is an activity which has few logically necessary attributes; at the same time propositions which state the empirical conditions for teaching to eventuate in learning are few (Turner, 1971). Scheffler (1960) suggests that the instructional activities of teachers may be conceived in terms of two sets of rules, "exhaustive rules" and "inexhaustive rules." Exhaustive rules apply to

activities where the rules, if followed according to the prescription, guarantee success. Inexhaustive rules are characterized by the kinds of strategies people employ to win games. Inexhaustive rules do not guarantee success, though they may increase the probability of success. Scheffler contends teaching is governed by inexhaustive rules.

If teachers are to productively apply even inexhaustive rules, it behooves researchers and teacher trainers to have a considerable degree of understanding of the empirical relationships between teacher behavior and student outcomes. Currently, such understanding is missing (Rosenshine & Furst, 1971, p. 66):

> Most studies on classroom instruction have been conducted by doctoral candidates, and there have been only a few large-scale experiments or correlational studies on teacher behavior and student achievement. Because of this lack of research, we have little knowledge of the relationship between teacher behavior and student growth. . . .Those responsible for teacher education have manifested their concern for the quality education of our youth through the preparation of the model elementary teacher education programs. However, as of this writing no one has shown that the behaviors identified in the models have any relevance for the real world. To be real, teacher behaviors need to be researched so that they are known to have some relationship to student outcome measures.

A second generalization one can make about teaching is that there are clearly different types of teaching as well as different types of learning. Scheffler (1960) distinguished among "teaching that,"

"teaching to," and "teaching how to." "Teaching that" consists of teaching for the purpose of someone to recall, comprehend, or understand particular information. "Teaching to" connotes prescriptive teaching that intends to influence someone's behavior. "Teaching how to" refers to assisting someone in the acquisition of particular skills or competencies. Hudgins (1971) has further distinguished between "teaching," instructional activities intended to eventuate in learning, and "management," activities intended to maintain a classroom environment conducive to learning. Hudgins also gives a clear discussion of two views toward classroom learning, "reception learning" and "discovery learning." My purpose here is not to discuss systematically the different types of learning or teaching except to indicate that there are indeed different types of classroom learning and teaching and that any discussion of teaching skills should recognize the differences.

Mastery of Skills for Effective Teaching

It is possible to reduce teaching to specific skills. One must admit that such is possible because it has been done, as in microteaching. Yet from the above discussion one must conclude that the various definitions of specific skills are not necessarily the proper ones. One must be careful to remember that the relationships between specific skills and student outcomes are merely presumed, not demonstrated at this time (Bush, 1967; Berliner, 1969; Rosenshine, 1971).

From the above discussion it is now possible to give at least partial answers to one of the first two microteaching assumptions. On the basis of experimental and correlational studies, researchers have little evidence to indicate a relationship between mastery of teaching "skills" and student outcomes. That is not to say that no relationship exists or that mastery of teaching skills is useless; it merely says that, given the current state of research in that area, the relationship has not been demonstrated.

Certainly the selection of skills to be covered in a microteaching program should not be a casual or mindless venture as Ward (1970) suggests it is currently in many institutions. Cooper et al. (1973) offer a reasonable scheme for specifying specific teacher competencies. According to their scheme, teacher competencies should be screened against four different bases: "philosophical", "empirical," "subject matter," and "practioner." Though the scheme admits the importance, and present weakness, of the empirical, subject matter, and practioner bases for choice, it emphasizes that the validity test for competencies lies in their degree of consistency with philosophical assumptions about the desired pupil outcomes and about teaching (Cooper et al., 1973, p. 19):

> While teaching competencies can and should be generated from empirical, subject matter, and practioner bases, they must be screened through a philosophical base and the conceptualized model of the teacher's role. Unless proposed competencies are compatible with the conceptionalized role of the teacher they should not be included in the program.

Are Teaching Skills Trainable?

The final microteaching assumption to be considered here is whether specific teaching skills are trainable via microteaching. The answer, based on my analysis of the research is a qualified "yes." Microteaching programs appear to be capable of changing teachers' behavior in the proper direction for specific skills. That conclusion must be qualified by a reminder that virtually all of the studies measured only frequency of occurrence of the target teacher behaviors, not the frequency or quality of "appropriate occurrence" of specific behavior (see p. 12).

Appropriateness of Microteaching as Training

Implicit in the "trainability" assumption is the issue of whether such training is appropriate even if it is possible. Glaser (1962) makes a distinction, pertinent here, between "training" and "education." Glaser recognizes that both terms connote the modification and development of student behavior; both are viewed as instructional processes. The distinction between "training" and "education" hinges on the degree of specificity of the behavioral end-products of learning and the extent to which the instructional process minimizes vs. maximizes individual differences. Training refers to instructional situations where the end-products of learning can be specified in terms of particular instances of student performance. Training implies a uniformity of the end-product, as individuals are expected to perform similar tasks in similar ways.

Training presumes a low degree of transfer of the learning to dissimilar situations. Education on the other hand applies where "End-product behaviors cannot be specified precisely because they are too complex or because the behaviors that result in successful accomplishment in many instances are not known" (Glaser, 1962, p. 4). Education emphasizes individual differences and attempts to maximize the extent to which a person applies a basic foundation of information in a manner singular to him. According to the notions of Glaser (1962) and Holding (1965), instructing a person in the use of a slide rule or welding machine would be a case of "training", while attempting to teach a person to be a creative scientist or novelist would more nearly be a case of "education."

Glaser's and Holding's distinctions between "training" and "education" are thought-provoking when applied to the microteaching discussion. Microteaching is more aptly characterized as "training" than as "education." Some evidence suggests that microteaching is at least minimally successful as training in specific behaviors. Yet the status of empirical knowledge about teaching and the easily argued complexity of teaching point to the conclusion that becoming a teacher is not yet, if ever, reducible to mere training.

Eabin (1969) and Pereira and Guelcher (1970) cautioned about potential unintended consequences of a training-oriented microteaching program, which must necessarily be based on insufficient knowledge about teaching. A serious danger is that a staff-developed "set of skills" tends

to become doctrinaire, implying that they are the essential components of good teaching when in fact the skills are just one staff's "slice" of teaching. Eabin (1969, p. 85) cautions:

> Microteaching trains teachers to perform in ways those who are running the program think is good. Like a programmed teaching machine, the goals of microteaching are set by those who administer the program; the goals are then analyzed in terms of their component parts, and a pattern is devised that will lead the teacher trainee to perform in the desired way we think he should. . . Can educators pretend that a set of skills (based on little research and much intuition) is necessary and sufficient for good teaching?

It is not my intention that this section of the paper be used as an iconoclastic statement about the utility or danger of microteaching. Perhaps the issues raised here will serve as a caution signal to the zealot and as catalyst to reflective thought and research into teaching and into the effects of microteaching. Clearly, much research and program development remain to be done.

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